

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**25.08.1999 Bulletin 1999/34**

(51) Int Cl.<sup>6</sup>: **H02M 7/48, H02M 7/00**

(43) Date of publication A2:  
**22.07.1998 Bulletin 1998/30**

(21) Application number: **98300388.0**

(22) Date of filing: **20.01.1998**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC**  
**NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **20.01.1997 JP 751397**  
**24.01.1997 JP 1099197**

(71) Applicants:  
• **Kabushiki Kaisha Toshiba**  
**Kanagawa-ken (JP)**

• **SCHNEIDER ELECTRIC SA**  
**92100 Boulogne Billancourt (FR)**

(72) Inventor: **Shirai, Seiichi**  
**Yokkaichi-shi, Mie-ken (JP)**

(74) Representative: **Waldren, Robin Michael et al**  
**MARKS & CLERK,**  
**57-60 Lincoln's Inn Fields**  
**London WC2A 3LS (GB)**

(54) **Inverter with incorporated filter circuit and improved component cooling arrangement**

(57) An inverter includes a rectifier circuit (12), an inverter circuit (15), a filter circuit (19) including an input side capacitor (24), a coil (25a; 25b; 25c), and an output side capacitor (26), the filter circuit (19) being disposed at a front stage of the rectifier circuit (12), a casing (36) accommodating the inverter circuit (15), the rectifier circuit (12) and the filter circuit (19), a first cooling chamber (65) defined in the casing (36), a second cooling chamber (66) defined in the casing (36) and partitioned by a

partition wall (64) from the first cooling chamber (65) so as to be adjacent to it, a plurality of vent holes (67, 68) formed in the partition wall (64), and a fan (39) for supplying a cooling air into the first cooling chamber (65) and further via the vent holes (67, 68) into the second cooling chamber (66). The inverter circuit (15) is cooled by the cooling air flowing into the first cooling chamber (65) and the coil (25a; 25b; 25c) of the filter circuit (19) is cooled by the cooling air flowing through the second cooling chamber (66).



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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 0388

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 688 092 A (HITACHI LTD.) 20 December 1995 (1995-12-20) * abstract * * column 25, line 33 - column 26, line 50 * * figures 16,17 * ---	1	H02M7/48 H02M7/00
X	EP 0 599 700 A (TELEMECANIQUE) 1 June 1994 (1994-06-01) * abstract * * column 1, line 52 - column 2, line 2 * * figures 1,2 * ---	1	
X	US 5 012 058 A (PETER H. SMIT) 30 April 1991 (1991-04-30) * figure 2 * ---	1	
X	US 5 428 268 A (JANOS MELIS ET AL.) 27 June 1995 (1995-06-27) * figure 4 * ---	1	
A	GB 2 300 766 A (MITSUBISHI DENKI KABUSHIKI KAISHA) 13 November 1996 (1996-11-13) * abstract * * figures 5,12,13 * * page 13, line 23 * * page 15, line 20 - page 16, line 4 * * page 22, line 6 - page 25, line 5 * ---	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H02M
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-The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 April 1999	Examiner LUND M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04001)



European Patent  
Office

Application Number

EP 98 30 0388

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1 - 8



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 0388

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 162 147 A (SIEMENS) 27 November 1985 (1985-11-27) * abstract * * figures 1,2,5 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		12 April 1999	LUND M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number  
EP 98 30 0388

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-8

Mechanical outline of an inverter input filter.

2. Claims: 9-12

Means for improving the cooling of an inverter mounted in a cabinet.

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 0388

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-04-1999

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82